



Employee Falls from Overhead Pipe Rack

Purpose

To share “lessons learned” gained from incident investigations through a small group discussion method format.

To understand “lessons learned” through a Systems of Safety viewpoint.



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Lessons Learned

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Background Information

Before beginning this Lessons Learned, please review this and the next page which contain information that will introduce the concepts of Lessons Learned and Systems of Safety.

Creating a safe and healthy workplace requires a never ending search for hazards that sometimes are not obvious to us. These hazards exist in every workplace and can be found by using various methods. Lessons Learned are just as the name suggests: learning from incidents to prevent the same or similar incidents from happening again.

Systems Are Not Created Equal: Not equal in protection and not equal in prevention.

Using our Systems Focus to uncover system flaws or root causes is only one part of controlling hazards. We also need to look at the systems involved to decide on the best way to deal with the problem. The most effective way to control a hazard is close to its source. The least effective is usually at the level of the person being exposed. The system of safety in which the flaw is identified is not necessarily the system in which you would attempt to correct the flaw.



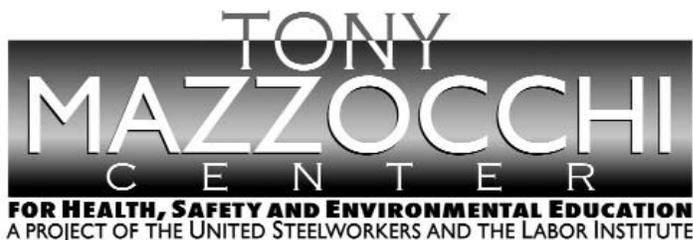
Major Safety System	Design & Engineering	Maintenance & Inspection	Mitigation Devices	Warning Devices	Training & Procedures	Personal Protective Factors
Level of Prevention	Highest—the first line of defense		Middle—the second line of defense			Lowest—the last line of defense
Effectiveness	Most Effective		←————→			Least Effective
Goal	To eliminate hazards	To further minimize and control hazards				To protect when higher level systems fail
EXAMPLES OF SAFETY SUB-SYSTEMS**	Technical	Inspection and Testing	Enclosures, Barriers Dikes and Containment	Monitors	Operating Manuals and Procedures	Personal Decision-making and Actions HF
	Design and Engineering of Equipment, Processes and Software	Maintenance	Relief and Check Valves	Process Alarms	Process Safety Information	Personal Protective Equipment and Devices HF
	Management of Change (MOC)**	Quality Control	Shutdown and Isolation Devices	Facility Alarms	Process, Job and Other Types of Hazard Assessment and Analysis	Stop Work Authority
	Chemical Selection and Substitution	Turnarounds and Overhauls	Fire and Chemical Suppression Devices	Community Alarms	Permit Programs	
	Safe Siting	Mechanical Integrity	Machine Guarding	Emergency Notification Systems	Emergency Preparedness and Response Training	
	Work Environment HF				Refresher Training	
	Organizational (must address a root cause)				Information Resources	
	Staffing HF				Communications	
	Skills and Qualifications HF				Investigations and Lessons Learned	
	Management of Personnel Change (MOPC)				Maintenance Procedures	
	Work Organization and Scheduling HF				Pre-Startup Safety Review	
	Work Load					
	Allocation of Resources					
	Buddy System					
	Codes, Standards, and Policies**					

HF - Indicates that this sub-system is often included in a category called Human Factors.

* There may be additional subsystems that are not included in this chart. Also, in the workplace many subsystems are interrelated. It may not always be clear that an issue belongs to one subsystem rather than another.

** The Codes, Standards and Policies and Management of Change sub-systems listed here are related to Design and Engineering. These subsystems may also be relevant to other systems; for example, Mitigation Devices. When these sub-systems relate to systems other than Design and Engineering, they should be considered as part of those other system, not Design and Engineering.

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Lessons Learned Statement:

The lack of high enough prioritization of safety work orders during the risk scoring of safety items resulted in the potential injury of an employee. *Systems of Safety* are utilized to provide prevention from this type of incident. A well-defined **Training and Procedures System of Safety**, *Sub-system Hazard Assessment*, approach provides protection by closing the gaps on safety issues that arise from risk scoring by providing good procedures. Properly risk scoring maintenance and operations tasks and instituting viable hazard assessment methods help provide greater protection for the employees.

While doing what may be considered normal for operations personnel, there are times that personal safety is put at risk to complete a job. Not following a procedure can be the result of many things: common practice; wanting to do a good job; undue pressure to get the job done; lack of training; or poor communication. All can put an employee at risk. The **Training and Procedures System of Safety** provides the mechanism with which these types of items can be effectively handled.

The **Training and Procedures System of Safety** for the employees in the facility should provide a procedure that includes a spotter/back-up to provide all employees with a system that provides a quick response if a fall does occur. Providing a system for discussing and reviewing (Job Safety Analysis (JSA)) work above ground ensures the job will proceed in a safe manner. A procedure that states that the job will not begin until it

has been discussed and a Job Safety Analysis has been performed would provide maximum protection and/or alternatives to above grade work in a harness system.

Communicating the importance of understanding and following the Fall Protection procedure is of paramount importance to Maintenance and Operations. Within this procedure, emphasis needs to be placed on potential safety consequences when working above grade. It should clearly explain what constitutes 100 percent tie-off for above grade work.

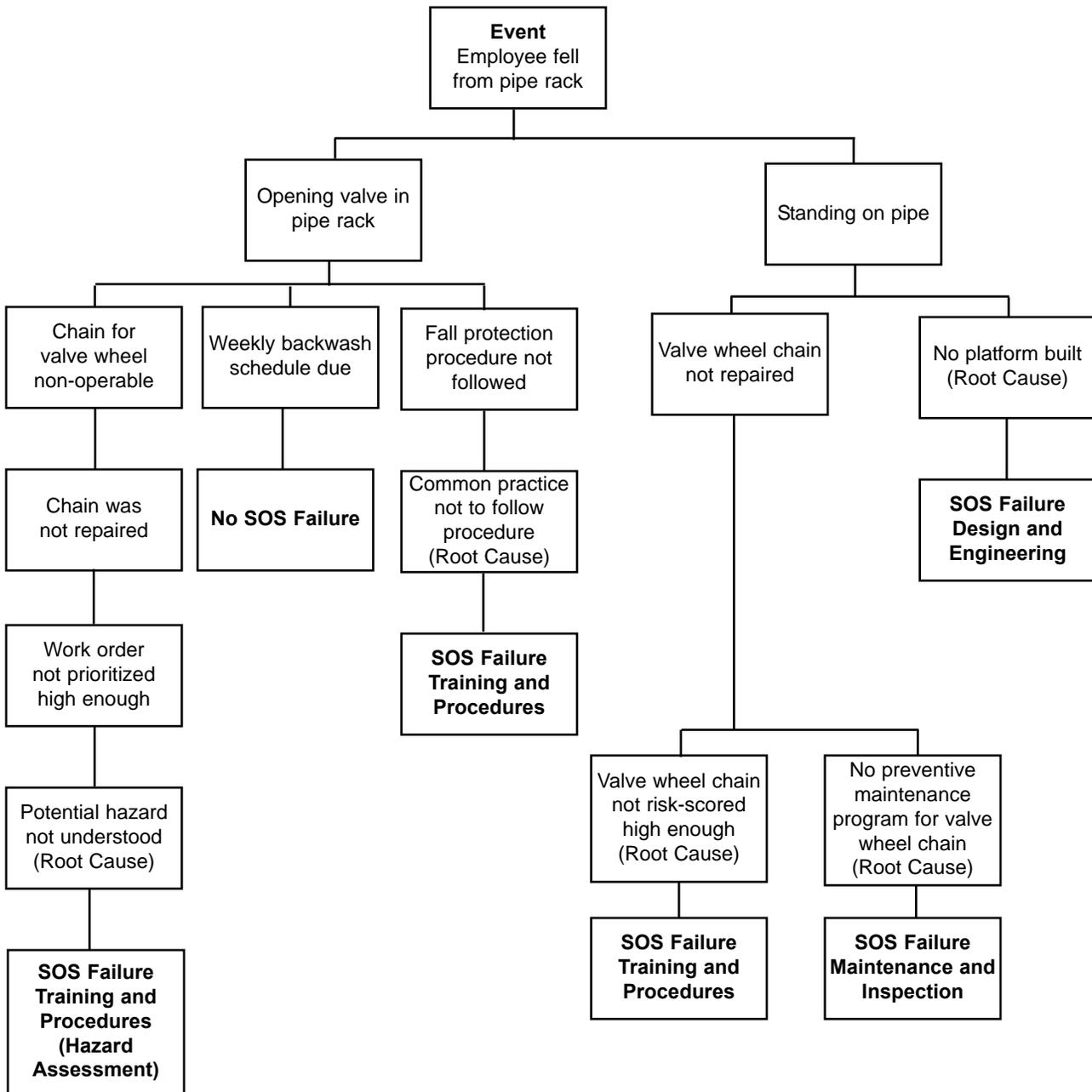
Ultimately, the best solution is to design out the problem. A well-defined **Design and Engineering System of Safety** approach provides the safest access to valves that are located above grade by installing permanent platforms or chain wheels for the valves.

Discussion:

An operator started to perform a backwash procedure on an exchanger (E-900) per the weekly backwash schedule. To perform the backwash task, the inlet cooling water block valve to E-900 must be closed. This valve is located in the overhead pipe rack. The valve was fitted with a chain wheel so it could be operated from grade level. When starting the backwash procedure, the operator noticed the chain to the cooling water valve was broken. A work order notification had been written to replace the broken chain for the valve wheel. The work order request was prioritized and placed in the work order system. The operator obtained the proper harness and lanyard required for above grade work and climbed up a ladder to a platform. There is no safe access to the cooling water valve. To gain access to the valve, the operator was required to go outside the platform on to the pipe rack. Once at the valve, the operator started to close the valve. In the process of closing the valve, the operator fell from the pipe rack. His harness functioned properly and caught the operator so that he was hanging from the pipe rack. The operator was able to climb back up into the pipe rack and onto the platform. He then returned to the shelter and notified the Shift Team Leader of the incident. A near-miss was written to make other employees aware of the potential hazard.

Analysis

The Logic Tree is a pictorial representation of a logical process that maps an incident from its occurrence, “the event,” to facts of the incident and the incident’s root causes.



Recommended Actions

1. Include hazard assessment as part of the risk scoring of maintenance and operations task

The hazard assessment is to include potential safety consequence of the tasks being risk scored.

Recommend Maintenance Planners and OMC's (Operation Maintenance Coordinators) discuss how to close the gaps on safety issues that arise from Risk Scoring. Provide and implement solution step. Hold meeting with all involved; provide sign-in sheet for tracking system.

Have OMC's do communication sessions with operators to promote understanding of the need to make safety concerns known when submitting safety work order notifications. Mark tickets "Safety Items."

2. Revise the Fall Protection procedure to require a spotter/backup be present when individuals are performing work in harness and lanyard above grade level.

Include language in the procedure and flow chart that would direct the user be required to contact the Shift Team Leader to discuss (JSA) safety issues or merits of whether work needs to be performed prior to having a scaffold built. This is to include all employees.

3. Provide training for maintenance and operations on updated Fall Protection procedure.

Maintenance and Operations are to communicate the importance of understanding and following the Fall Protection procedure.

More emphasis of what 100 percent tie off constitutes and the potential safety consequences if this is not done.

continued

Recommended Actions (continued)

4. Write lessons learned training on this event and distribute it throughout the facility.

Recommend that a training package be developed to share procedure revisions to the Fall Protection procedure and test knowledge of employees on those changes.

Refinery Shift Leader is to hold team meeting on shift to review the procedure and discuss changes to the Fall Protection procedure, and discuss the importance of performing and completion of JSA requirements and following the procedure

5. Institute a PM (preventive maintenance) program for valve chain wheels and chains.
6. Install a platform to provide safe access to the valve.

Education Exercise

Working in your groups and using the Lessons Learned Statement, Discussion, Analysis and Recommended Actions, answer the two questions below. Your facilitator will give each group an opportunity to share answers with the large group.

1. Give examples of ways to apply the Lessons Learned Statement at your workplace.

2. Of the examples you generated from Question 1, which will you pursue in your workplace? (**Note:** When we say something you may pursue, we mean a joint labor-management activity or a union activity rather than an activity carried out by you as an individual.)

Trainer’s Lessons Learned Success Inventory

Following a Lessons Learned (LL) session, **the trainer who led the LL** should complete this form. This information will: 1) Help you reflect on the successes and challenges of the session; 2) Help USW with new curriculum development; and 3) Help USW as a whole better understand how the LL Program is supporting their workers.

By reviewing LL from different sites or from other areas of their workplaces, workers are able to analyze the information and apply these lessons to their own workplaces in order to make their workplaces healthier and safer.

1. Site name (if there are participants from more than one site, please list all).

2. Date of LL training _____

3. LL number used in today’s Training _____

4. Your name _____

5. **Summary of Education Question 1:** Please summarize participants’ examples of ways to apply this LL Statement to their workplace.

Please continue on reverse side.

- 6. Summary of Education Question 2:** Please summarize which actions or recommendations participants discussed pursuing at their workplace(s).

Thank you for completing this form.

EVALUATION

Lessons Learned: Employee Falls from Overhead Pipe Rack

Please answer the two questions below:

1. How important is this lessons learned to you and your workplace? (Circle one.) Rate on a scale of 1 to 5, with 5 being the most important.

1	2	3	4	5
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2. What suggestions would you make to improve this Lessons Learned?

End of Training Trainer's Instructions

Please complete the information below.

Trainer's Name _____
(Please Print)

Date of training: _____

No. of Participants: Total _____ Hourly _____ Management _____

Location of Training: _____

USW Local # _____

Send:

1. This page;
2. The Education Exercise (page 9);
3. The Trainer's LL Success Inventory form (pages 11 and 12);
4. The evaluation for each participant (page 13); and
5. The Sign-in sheet (page 14) to:

Doug Stephens
United Steelworkers International Union
3340 Perimeter Hill Drive
Nashville TN 37211

Thank you for facilitating the sharing of this
Lesson Learned with your coworkers.

